GREENSCAPE CALCULATION

FRONT SETBACK AREA	530.9 SQ. FT.
DRIVEWAY (HARDSCAPE)	262 SQ. FT.
GREENSCAPE	268.9 SQ. FT.

AREA OF GREENSCAPE = 268.9/530.9 = 50.6%

LOT SQUARE FOOTAGE = 18,670 SQ. FT.
ABOVE LINE OF O.H.M. = 15,628 SQ. FT.
PRIVATE ROAD ESM'T = 1,063 SQ. FT.
CRITICAL AREA = 1,317.4 SQ. FT.

FLOOR AREA RATIO 50% MAX
- NO MITIGAGTION

IMPERVIOUS SURFACE CALCS (45% MAX)

HOME & ADDITION W/ EAVES	1472 SQ. FT.
COTTAGE W/ EAVES & DECK	1525 SQ. FT.
RAISED MOTOR COURT	0 SQ. FT.
CONCRETE DRIVE & WALK	1532 SQ. FT.
REAR CONCRETE PADS	436 SQ. FT.
REAR PATIO	343 SQ. FT.
TOTAL	5308SQ. FT.
LOT SQUARE FOOTAGE	13,247.6 SQ. FT.
PERCENTAGE OF COVERAGE	40%

STRUCTURAL COVERAGE CALCS (35% MAX)

NEW & EXISTING STRUCTURE IN 75' BSBL	936 SQ. FT.
ADA COMPLIANT MOTOR COURT (GAPS MEASURING 1/8" OR GREATER - 1677 SF)	0 SQ. FT.
STRUCTURE IN CRITICAL AREA	373 SQ. FT.
DECK & STAIRS 30" ABOVE GRADE	560 SQ. FT.
NEW & EXIST. RESIDENCE OUTSIDE 75' BSBL	334 SQ. FT.
COTTAGE W/ DECK	1373 SQ. FT.
DECK	376 SQ. FT.
TOTAL	3952 SQ. FT.
NET LOT SQUARE FOOTAGE	13,247.6 SQ. FT.
PERCENTAGE OF COVERAGE	29.8%

TREE INVENTORY

EXIST. TREE NO.	SPECIES	DIAMETER	RETAINED
T1	MAPLE	12" (20' DL)	YES
T2	MAPLE	18" (15' DL)	YES
T3	MAPLE	48" (18' DL)	YES
T4	C.WD.	14" (8" DL)	NO
T5		DEAD	NO
T6	CEDAR	14" (12' DL)	YES
T7	CEDAR	30" (12' DL)	YES
T8	FIR	36" (20' DL)	YES
T9	FRUIT	8"	YES
TOTAL		180"	
TOTAL REMOVED		14"	

SITE PLAN

SCALE 1"=10'-0"

5643 PLEASURE POINT LANE SE
BELLEVUE, WA 98006

PARCEL #202405-9049 ZONING - R-2.5

LEGAL DESCRIPTION

THAT PORTION OF GOVERNMENT LOT 3 IN SECTION 20, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., AND OF THE SHORE LANDS OF THE 2ND CLASS SITUATE IN FRONT OF, ADJACENT TO, OR ABUTTING UPON SAID GOVERNMENT LOT 3, DESCRIBED AS FOLLOWS: BEGINNING AT THE INTERSECTION OF THE WESTERLY MARGIN OF THE RIGHT OF WAY OF THE NORTHERN PACIFIC RAILWAY COMPANY WITH THE SOUTHERLY LINE OF THE NORTHERLY 495 FEET OF SAID LOT 3, AND RUNNING THENCE WESTERLY, ALONG SAID SOUTHERLY LINE AND THE SAME PRODUCED WESTERLY, TO THE INNER HARBOR LINE OF LAKE WASHINGTON; THENCE NORTHERLY, ALONG SAID INNER HARBOR LINE, TO AN INTERSECTION WITH A LINE DRAWN PARALLEL WITH AND DISTANT 48 FEET NORTHERLY (MEASURED AT RIGHT ANGLES) OF THE SOUTHERLY LINE OF THE NORTHERLY 495 FEET OF SAID LOT 3; THENCE EASTERLY, ALONG SAID PARALLEL LINE, TO AN INTERSECTION WITH SAID RAILWAY RIGHT OF WAY, THENCE SOUTHERLY ALONG SAID RIGHT OF WAY TO POINT OF BEGINNING.

TOGETHER WITH AN EASEMENT FOR ROAD PURPOSES OVER THAT PORTION OF THE NORTH 495 FEET OF SAID GOVERNMENT LOT 3, DESCRIBED AS FOLLOWS: BEGINNING AT A POINT OF INTERSECTION OF THE SAID WESTERLY MARGINAL LINE OF THE RAILROAD RIGHT OF WAY WITH THE NORTHERELY LINE PRODUCED WESTERLY OF THE ELLA B. ERBACH COUNTY ROAD, AS CONVEYED TO KING COUNTY BY DEED BEARING AUDITOR'S FILE NO. 2672718 AND RECORDED IN VOLUME 1498 OF DEEDS, PAGE 364, RECORDS OF KING COUNTY; AND RUNNING THENCE N60°45'W 20 FEET; THENCE SOUTHERLY ON A LINE 20 FEET WESTERLY FROM AND PARALLEL WITH SAID WESTERLY MARGINAL LINE OF THE RAILROAD RIGHT OF WAY, TO THE NORTH LINE OF THE TRACT HEREBY CONVEYED; THENCE EAST ALONG SAID NORTH LINE TO THE SAID WESTERLY MARGINAL LINE OF THE RAILROAD RIGHT OF WAY; THENCE NORTHERLY ALONG SAID WESTERLY LINE TO THE POINT OF BEGINNING.

5643 PLEASURE POINT LANE SE
BELLEVUE, WA 98006

JOB # (18024)

REVISED:

horner design associates inc. (425) 226-8281
12114 se may creek Pk. Dr. newcastle, wa 98056

DATE:
SCALE: 1"=10'-0"
SHEET 01

NOTE: VERIFY ALL DIMENSIONS

PLANT LEGEND FOR SUNNY SITES

TREES	
1. ACER MACROPHYLLUM/ BIG-LEAF MAPLE	9 FEET O.C. / 75'
2. ALNUS RUBRA / RED ALDER	9 FEET O.C. / 60'
3. PSEUDOTSUGA MENZIESII / DOUG FIR	9 FEET O.C. / 100'
SHRUBS	
4. CORYLUS CORNUTA / BEAKED HAZELNUT	4.5 FEET O.C. / 11'
5. HOLODISCUS DISCOLOR / OCEANSPRAY	4.5 FEET O.C. / 7'
6. PHILADELPHUS LEWISII / MOCK ORANGE	4.5 FEET O.C. / 8'
7. RUBUS PARVIFLORUS / THIMBLEBERRY	4 FEET O.C. / 8'
8. SYMPHORICARPOS ALBUS / SNOWBERRY	4.5 FEET O.C. / 5'
GROUNDCOVERS & PERENNIALS	
9. ARCTOSTAPHYLOS UVA-URSI / KINNIKINNICK	24 IN. O.C. / 6-8 IN.
10. FRAGARIA CHILOENSIS / COASTAL STRAWBERRY	24 IN. O.C. / 4-6 IN.
11. FESTUCA IDAHOENSIS / IDAHO FESCUE	24 IN. O.C. / 2.5'
12. POLYSTICHUM MUNITUM / SWORD FERN	24 IN. O.C. / 5' ONCE MATURE
13. EPILOBIUM AUGUSTIFOLIUM / FIREWEED	24 IN. O.C. / 1.5-2 FT.

PLANT LEGEND FOR SHADY SITES

TREES	
1. ACER MACROPHYLLUM/ BIG-LEAF MAPLE	9 FEET O.C. / 75'
2. ALNUS RUBRA / RED ALDER	9 FEET O.C. / 60'
14. THUJA PLICATA / WESTERN RED CEDAR	9 FEET O.C. / 150'
SHRUBS	
4. CORYLUS CORNUTA / BEAKED HAZELNUT	4.5 FEET O.C. / 11'
15. ACER CIRCINATUM / VINE MAPLE	4.5 FEET O.C. / 20'
16. AMELANCHIER ALNIFOLIA / WESTERN SERVICEBERRY	4.5 FEET O.C. / 20'
17. OEMLERIA CERASIFORMIS / OSOBERRY	4 FEET O.C. / 10'
18. SAMBUCUS RACEMOSAL / RED ELDERBERRY	4.5 FEET O.C. / 15'
GROUNDCOVERS & PERENNIALS	
9. ARCTOSTAPHYLOS UVA-URSI / KINNIKINNICK	24 IN. O.C. / 6-8 IN.
12. POLYSTICHUM MUNITUM / SWORD FERN	24 IN. O.C. / 5' ONCE MATURE
19. ASARUM CAUDATUM / WILD GINGER	24 IN. O.C. / 6-8 IN.

LOT SQUARE FOOTAGE = 18,670 SQ. FT.
ABOVE LINE OF O.H.M. = 15,628 SQ. FT.
PRIVATE ROAD ESM'T = 1,063 SQ. FT.
CRITICAL AREA = 1,317.4 SQ. FT.

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T5		DEAD	NO
T6	CEDAR	14" (12' DL)	YES
T7	CEDAR	30" (12' DL)	YES
T8	FIR	36" (20' DL)	YES
T9	FRUIT	8"	YES
TOTAL		180"	
TOTAL REMOVED		14"	

PLANTING MITIGATION PLAN

SCALE 1"=10'-0"

5643 PLEASURE POINT LANE SE
BELLEVUE, WA 98006

PARCEL #202405-9049 ZONING - R-2.5

LEGAL DESCRIPTION

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DATE:
SCALE: 1"=10'-0"
SHEET 01

Received MAR 05 2019 Permit Processing

NOTE: VERIFY ALL DIMENSIONS

GEO Group Northwest, Inc.

Geotechnical Engineers, Geologists, & Environmental Scientists

October 12, 2018

G-4755

Mr. J. Mike Brown
3703 Lake Washington Blvd. N.
Renton, Washington 98056

Subject: Geotechnical Engineering Study and Critical Areas Report, Proposed Residential Redevelopment, 5643 Pleasure Point Lane SE, Bellevue, Washington

Dear Mr. Brown:

GEO Group Northwest is pleased to present our geotechnical engineering study and critical areas report for your proposed residential redevelopment project at the above-subject property in Bellevue, Washington.

BACKGROUND

Site Description

The project site consists of an approximately rectangular-shaped parcel in a residential area in the Pleasure Point area of Bellevue, Washington, as illustrated in Plate 1 – Site Location Map. The site has approximate dimensions of 48 feet north to south and 315 feet west to east. Pleasure Point Lane SE runs along the east side of the site, and the west side of the site is along the Lake Washington shoreline. Developed residential lots abut the north and south sides of the site.

The site has west-facing sloping topography that has been modified into three relatively flat areas by past grading. The slope is vegetated with ivy, blackberry vines, and lesser unmaintained landscaping plants. Underground utility lines that serve the house cross through the steep slope area on the southern side of the site. The existing improvements on the site are depicted in Plate 2 – Site Plan.

13705 Bel-Red Road, Bellevue, Washington 98005
Phone 425/649-8757 · Fax 425/649-8758

We understand the project includes replacing the existing house with a new house in the similar location except for slightly expanding its north-to-south footprint, and extending the existing driveway westward along the southern side of the site and constructing a bridge to connect the extended driveway to the house. We understand that the house will have two stories plus a daylight basement level. The existing garage/accessory structure on the east part of the site is planned to be remodeled into an accessory dwelling structure in its existing location. The proposed location of the new house, the extended driveway and new bridge, and the accessory structure are shown in Plate 2 – Site Plan.

Geologic Overview

Published geologic mapping indicates that surficial soil units in the vicinity of the site consist of 'Older Sand' and 'Older Clay' units. The 'Older Sand' unit typically consists of glacial advance outwash deposits composed of fine to medium grained sand and lesser layers of gravelly sand and silty sand. The 'Older Clay' unit stratigraphically underlies the 'Older Sand' and typically consists of glacio-lacustrine silt and clayey silt with lesser fine sandy lenses. Areas near the Lake Washington shoreline also locally mantled with a relatively thin layer of loose, sandy to silty, alluvium or lakeshore deposits.

SUBSURFACE INVESTIGATION

On August 20, 2018, a geologist from our office directed the drilling of three exploratory soil borings at the site to investigate the soil and groundwater conditions. The borings were completed using a manually-portable drilling rig equipped with hollow-stem augers. The borings reached depths ranging between 19 and 21.5 feet below the ground surface (bgs), and were terminated in dense or very stiff native soils. The boring locations are depicted in Plate 2 – Site Plan.

Soils encountered in borings B-1 and B-2 on the lower-elevation west and middle parts of the site typically consisted of interlayered, loose and soft, fine-grained sand, silty sand, and silt to a depth of approximately 12 feet. The interlayered soils were found to be underlain with stiff to very stiff silt to the bottom of both borings.

Soils encountered in boring B-3 on the upper-elevation east part of the site consisted of fine-grained sand to a depth of approximately 18 feet, underlain with silt to the bottom of the boring at 21.5 feet bgs. The sand was found to be loose to a depth of approximately 6 or 7 feet, then progressively increased in density from medium dense toward dense at a depth of 15 feet. The silt was found to be hard.

Groundwater encountered at a depth of approximately 4 feet in boring B-1 and at approximately 8 feet in boring B-2 in the interlayered sandy and silty soils. Groundwater was not encountered during drilling in boring B-3. No indications of seasonal saturation of the sandy soils overlying the silt were noted in this boring. The deeper silt soils encountered in each of the borings were found to be unsaturated.

Interpretation of Subsurface Conditions

The soil conditions encountered in borings B-1 and B-2 on the western part of the site are interpreted as alluvium or reworked outwash overlying very stiff to hard, typically unsaturated silt of the 'Older Clay' geologic unit. The soil conditions encountered in boring B-3 on the eastern part of the site are interpreted as advance glacial outwash sand ('Older Sand') directly overlying silt of the 'Older Clay' unit.

Prior to approximately 1905, the elevation of the water surface of Lake Washington was approximately 10 feet higher than it is in present time as a result of the construction the Lake Washington Ship Canal and Ballard Locks system in Seattle. Thusly, lakeshore-type deposits and formerly saturated conditions are typical for near-surface soils at elevations near and below approximately 30 feet (except where modified by past grading). Therefore the soils encountered in boring B-1 are interpreted to be lakeshore deposits underlain with the 'Older Clay' geologic unit.

The loose and soft interlayered soils found in boring B-2, however, are present at elevations up to 36 feet. Therefore, these soils may be transitional deposits between the 'Older Sand' and 'Older Clay' geologic units, or may be stratified alluvium derived from upland exposures of these units.

GEOLOGIC CRITICAL AREAS EVALUATION

Identification of Geologic Critical Areas

Landslide Hazard

The site property has a west-facing steep slope area in its middle portion. This slope has inclinations ranging up to approximately 70 percent grade and a maximum height of approximately 18 to 19 feet. Topography beyond the top and the bottom of the slope is essentially flat for distances exceeding the height of the slope.

There is no known history of landslides occurring on the site property. No springs on the site property have been documented, and none were observed during our site investigation activities. The site property also is not located in an active alluvial fan area.

Based on the site property characteristics described above, and the surface and subsurface soil and groundwater conditions found in the borings completed on the site property, it is our opinion that the site property does not meet the criteria to be identified as a landslide hazard critical area per BCC 20.25H.120.A.1. However, because gradients are in excess of 40 percent for 10 or more vertical feet, the subject slope could be characterized as a potential landslide hazard. As stated above in Site Description portion of this report, the slope was observed to be devoid of evidence of current or previous instability. Therefore, it is our opinion that the potential landslide hazard can be characterized as low.

Steep Slope

The steep slope area on the middle part of the site has inclinations up to approximately 70 percent grade and a maximum height of approximately 18 to 19 feet. The steep slope area has an apparent extent of about 1,200 square feet, based on our interpretation of the topographic site plan data. Therefore, it is our opinion that the steep slope area meets the criteria of a minimum size of 1,000 square feet for being identified as a steep slope critical area per BCC 20.25H.120.A.2. It should be noted, however, that the steep slope area apparently has been modified by past grading activities which appear to have steepened it from its past condition, especially in its southern portion where underground utility crossings are present.

Coal Mine Hazard

No coal mine hazard areas are documented to be present at the site property.

Other Considerations: Soil Liquefaction

Saturated soils encountered in boring B-1 consisted of loose sand and silty sand and soft silt having a total thickness of approximately 4 feet. Saturated soils encountered in boring B-2 consisted of loose sand and silty sand and soft silt having a total thickness of approximately 6 feet. Relatively clean sand which could be susceptible to liquefaction comprises a minority of these soils in both borings. For this reason, it is our opinion that the soils encountered in these borings have low susceptibility to liquefaction from seismic events.

Identification of Critical Areas Standards to be Modified

The proposed project seeks to obtain modifications to the following critical areas standards and regulations:

- Reduction to top of steep slope area structure setback noted in BCC 20.25H.120.C.2.
- Reduction to top of steep slope area buffer noted in BCC 20.25H.120.B.1.
- Development with a steep slope critical area per BCC 20.25H.055 and BCC 20.25H.065.

Analysis of Proposed Project

Description of Proposed Project

A description of the proposed project provided by the project owner is presented in Attachment 3 to this report. Based on our review of this information and the proposed layout illustrated in the topographic site plan provided to us, we understand that the project includes the following elements:

- Construction of a new residence in similar location to the existing residence on the western portion of the site, but with expansion of a few feet to the south and approximately 10 feet to the east, and an additional story;
- Construction of an extension of the existing driveway and a driveway bridge to provide access to the new resi
- Possible construction of a conventional concrete retaining wall at or near the base of the steep slope area for supporting the proposed driveway bridge;
- Installation of augered concrete piles and small-diameter pipe piles in proximity to and within the steep slope area for supporting the proposed driveway bridge; and
- Renovation of the existing accessory structure on the east part of the site into an accessory dwelling structure with similar footprint.

Relationship to Critical Areas

The proposed replacement of the existing residence with a new residence on the western portion of the site will occur within the standard 75-feet building setback distance from the bottom of the steep slope critical area. Construction of the proposed new driveway bridge east of the residence will cross into the standard steep slope building setback area, steep slope area, and standard 50-feet steep slope buffer area.

Review of Proposed Project Conformance with Performance Standards

BMC 20.25H.125 provides performance standards that must be adhered to for development occurring within potential landslide and steep slope hazards areas. These standards and our evaluation of the conformance of the proposed project with these standards are presented as follows:

A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography.

> The new residence and accessory building will be constructed within the flatter areas of the project site, and not in close proximity to the steep slope area. Therefore, minimal tiering or stepping of foundations will be needed.

B. Structures and improvements shall be located to preserve the most critical portion of the site and its natural landforms and vegetation.

> The steep slope area of the site currently has poor-quality landform and vegetation with regard to standard natural conditions. This portion of the property maintains the flattest gradient and is considered the most advantageous for development with consideration to buffer requirements from identified hazards and critical areas on the site.

C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties.

> Construction of the residence at its proposed location will not result in greater risk or the need for increased buffers on neighboring properties. The southern edge of the proposed driveway bridge is planned to be located at least 5 feet from the south property line and piles to support the bridge are planned to be located 9 feet from the property line.

D. ~~The use of retaining~~ walls that allow the maintenance of existing natural slope area is preferred over graded artificial ~~slopes where graded slopes~~ would result in increased disturbance ~~as compared~~ to use of retaining wall.

NO RETAINING WALL OR GRADING IS NOW PROPOSED.
J. Mike Brown
OWNER
12/19/2018

GEO Group Northwest, Inc.

We do not anticipate the use of re-graded slopes in the proposed project, with the exception of the minimum needed to construct the pile-supported, elevated driveway bridge that crosses the steep slope area.

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer.

The proposed driveway bridge area can be designed to have pervious surfaces in part or in whole, where consistent with accessibility, safety, and pollutant generation considerations. Exterior patio and walkway areas in proximity to the bottom of the steep slope area can incorporate low-impact development practices such as permeable surfaces or bordering dispersion strips as appropriate to manage stormwater associated with these elements.

F. Where change in grade outside the building footprint is necessary, the site retention system should be stepped, and re-grading should be designed to minimize topographic modification. On slopes in excess of 40 percent, re-grading for yard areas may be disallowed where inconsistent with this criteria.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation.

Based on the proposed location for the new residence and limited extent of new footprint in an eastward direction, it will not be feasible to not use a free-standing retaining wall of partial height at the bottom of the steep slope for supporting the proposed driveway bridge. This retaining wall can be designed to be limited to lowest height practicable in consultation with the project parties and permitting agency. Construction of the new residence, however, will not require significant grade changes around its perimeter in proximity to the steep slope area or proposed setback.

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification.

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types.

Proposed project plans indicate that the driveway bridge and deck area for the residence will be supported on a combination of augered concrete piles and driven small-diameter steel pipe piles, consistent with this standard.

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and/or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

In our opinion, landscaping improvements (including the removal of existing invasive ground cover and replanting with native species) is recommended for areas that will be disturbed by construction activity. As a result, it is likely that some degree of landscaping improvements within the steep slope and buffer areas will be needed. We recommend that a landscaping/revegetation plan for such disturbance should be prepared and be reviewed by the geotechnical engineer.

Potential Impacts to Critical Areas

Potential impacts to the steep slope critical area on the site include ground disturbance associated with construction of the proposed driveway extension and bridge, provisions for access of equipment and materials for demolition and construction work for the residence, and possible removal of invasive plant species and replacement with appropriate vegetation consistent with an approved re-vegetation / restoration plan. The ground disturbance may cause some limited shallow soil sloughing and erosion. Significant excavation in the most sensitive areas is not planned, so the extent of these possible impacts can be adequately mitigated by implementing appropriate temporary erosion and sediment controls during construction.

In our opinion, the proposed project will not result in additional cumulative impacts to the steep slope critical area after its completion, provided that 1) the design and construction recommendations presented in this report are properly implemented; and 2) an approved mitigation and restoration plan to re-stabilize areas of ground disturbance on and in proximity to the steep slope is properly implemented.

Potential Impacts on Project Property and Adjacent Properties

Provided that unsupported excavation work on site does not extend below 1H:1V lines projected from the property boundaries, it is our opinion that the proposed project will not adversely impact adjacent properties. Also, provided that the earthwork recommendations provided in this report are properly implemented, it is our opinion that the proposed project will not adversely affect the stability of the project property.

Minimum Geologic Hazard Critical Areas Buffer and Building Setback

In our opinion, for the proposed project as described above, the steep slope critical area building setback and buffer both can be reduced to 15 feet for buildings and to 0 feet for the proposed driveway bridge elements without adversely affecting the existing stability of the steep slope, provided that the design and construction recommendations presented in this report are properly implemented.

Mitigation of Impacts to Geologic Hazard Critical Areas

Adverse impact to the steep slope critical area on the project site can be mitigated by implementing the following elements:

- Avoid unnecessary disturbance to slope areas that have inclinations steeper than 15 percent grade;

- Use stepped benches for temporary grades to limit slopes to not more than 15 percent grade;

- Use appropriate BMPs to control and direct surface water in disturbed areas to minimize soil erosion and sedimentation;

- Cover stockpiled soils and exposed slopes with plastic sheeting when not being worked; and

- Re-establish soil-stabilizing vegetation in disturbed areas for post-construction, long-term erosion control.

- Minimize excavation work to construct support for buildings and appurtenant structures by the use of augered concrete piles or small-diameter steel pipe piles in locations where acceptable load bearing soils are not present in proximity to existing site grades.

These recommendations should be incorporated into a critical areas re-vegetation / restoration plan for the proposed project.

DESIGN AND CONSTRUCTION RECOMMENDATIONS

From a geotechnical standpoint, it is our opinion that the proposed project can be completed safely, provided that the recommendations in this report are fully implemented during the project design and construction.

Earthwork

Site Preparation

Building areas should be grubbed and stripped of topsoil, loose soil, organic soil, and soil containing debris. These materials should not be used as structural fill, but can be re-used in landscaping areas if desired. Vegetation cover beyond construction limits should be maintained during the project, unless otherwise considered and managed per a re-vegetation / restoration plan.

Erosion Control

Installation of temporary erosion and sediment control methods, such as perimeter silt fencing, is recommended prior to site disturbance to mitigate potential stormwater runoff. Other erosion control measures, such as use of straw wattles or berms, settlement ponds, mulching and covering stockpiled soil should be implemented as needed. A construction entrance consisting of crushed rock should be installed to mitigate tracking of soil off site.

We also recommend installing interceptor trench drains along the upslope side of the construction area, as required, to intercept and divert surface. The drains should be directed to convey the water to an acceptable discharge point.

Cuts and Fills

We recommend that excavation slopes not be steeper than the limits specified by local state and federal safety regulations if workers are to be present in excavated areas. Unsupported temporary cuts greater than 4 feet in height should be no steeper than 1.25H:1V in loose or soft soils, and no steeper than 1H:1V in dense or very stiff soils. We recommend that permanent cuts should be no steeper than 3H:1V in loose or soft soils, and no steeper than 2.5H:1V in dense or very stiff soils. We recommend that cut slopes be observed and evaluated by the geotechnical engineer during excavation.

Permanent fill embankments required to support structures or traffic loads should be constructed using compacted structural fill placed over proof-rolled, undisturbed competent soils. Sloping ground exceeding 15 percent grade over which fill is to be placed should be benched with vertical steps no more than 4 feet high after stripping unsuitable surficial soils. The slope of permanent fill embankments should be steeper than 2.5H:1V. Upon completion, the sloping face of permanent fill embankments should be thoroughly compacted to a non-yielding state with a hoe-pack.

The above recommended cut and fill slopes anticipate that groundwater seepage will not be encountered during earthwork. If groundwater is encountered, however, we recommend that construction work should be halted and that the soil stability conditions be re-evaluated. Depending upon the conditions, cut slopes may need to be flattened or other measures may need to be implemented to provide stable conditions.

Structural Fill

Structural fill is defined as compacted engineered fill soil used to support building foundation loads, floor slabs, patios, porches, retaining walls, sidewalks, and pavements. In general, soils containing silt are moisture sensitive and can be difficult to compact to structural fill compaction specifications depending on the material's moisture content and the time of year construction takes place. Soils containing organics, debris and/or rubble should not be used as structural fill.

We recommend that material to be used as structural fill meet the following specifications.

1. Be a predominantly granular material free of clumps and chunks;
2. Be free of organics and other deleterious substances;
3. Have a maximum particle size of three-inches; and
4. Have a moisture content within two percent of its optimum content for compaction purposes.

During wet weather conditions, we recommend that structural fill also consist of granular material containing no more than 5% material passing a No. 200 sieve based on the fraction of the material passing No. 4 sieve, in addition to the above-listed specifications. Structural fill should be stockpiled and covered to protect it from moisture, where appropriate.

The site soils on the western and middle portion of the property contain a high percentage of silt and have high moisture contents, and likely will not be capable of achieving the structural fill compaction specifications. The site soils on the eastern portion of the site (above the steep slope) are relatively sandy and may acceptable for use as structural if they have proper moisture contents.

Structural fill should be placed in lifts no more than 10-inches thick in loose condition, with each lift compacted to a minimum percentage of the maximum dry density determined by ASTM D1557 (Modified Proctor Method), as follows:

Compaction Recommendations for Structural Fill

Construction Application	% of Maximum Dry Density
Within Building Pads	95%
Driveway Subgrade	95% for top 1 foot, and 90% below
Retaining Wall Backfill	90%
Utility Trench Backfill	95% for top 1 foot, and 90% below

Structural fill within public rights-of-way should be compacted to applicable public agency specifications. Structural fill in utility trenches should be compacted to the relevant utility district or municipal specifications, where applicable.

Subgrade Stabilization

A thin layer of crushed rock can be placed on prepared footing subgrades, if desired, to protect the subgrade from disturbance by construction activity. If groundwater seepage is encountered during excavation for footings, we recommend the excavations be gently sloped to direct the water to a sump pit from which it can be pumped to a suitable stormwater management facility.

Foundations

The proposed new residence on the west portion of the site can be supported on a system of grade beams and small-diameter steel pipe piles. We reviewed the option of using conventional footings, but the loose soil conditions found during our subsurface exploration indicate that the footings and floor slabs will need to be supported on a structural fill pad to avoid potential undesirable post-construction settlement. Construction of such a building pad would present logistical complications involving removal of excavated soils and importing a significant quantity of structural fill.

Small-Diameter Pipe Piles

The proposed new residence can be supported on small-diameter steel pipe piles which are driven using a jackhammer or hydraulic hammer. The piles are driven until condition is reached where the resistance of the subsurface soils sufficiently retards or terminates the advancement of the pile; this condition commonly is called "refusal".

Based on the findings from our subsurface investigation, we estimate that pipe pile installation depths in the proposed new residence location may reach depths of approximately 25 feet. The soil conditions at the site are not significantly corrosive, and the piles used for the project can consist of non-galvanized pipe.

The depth at which refusal is achieved is dependent upon the type of pipe and driving hammer that are used, and the characteristics of the subsurface soils that the pile encounters. The following table presents design criteria for commonly-available combinations of driving hammers and pipe sizes. The following capacities include a factor of safety of 2.

Pipe Pile Design Criteria

Pipe Diameter	Pipe Wall Thickness	Hammer Weight Class	Hammer Type	Refusal Criteria*	Allowable Capacity
2 inch	Schedule 80	90 pound	jackhammer	60 sec/inch	3 tons
2 inch	Schedule 80	140 pound	Rhino hammer	60 sec/inch	3 tons
3 inch	Schedule 40	650 pound	TB225†	12 sec/inch	6 tons
3 inch	Schedule 40	850 pound	TB325†	10 sec/inch	6 tons
4 inch	Schedule 40	850 pound	TB325†	16 sec/inch	10 tons
4 inch	Schedule 40	1100 pound	TB425†	10 sec/inch	10 tons
6 inch	Schedule 40	2000 pound	TB725†	12 sec/inch	15 tons

* = Maximum penetration rate sustained through at least 3 time cycles of continuous driving.
† = Teledyne hydraulic hammer model number, or equivalent.

No reduction in the pile capacities is required if the pile spacing is at least three times the pile diameter; otherwise, the capacities should be re-evaluated to account for group effects. A one-third increase in the above allowable pile capacities can be used when considering short-term transitory wind or seismic loads.

By themselves, pipe piles do not generate lateral capacities. Lateral forces can be resisted by the passive earth pressures acting against the sides of footings or grade beams or by friction between these elements and the subgrade. To fully mobilize the passive pressure resistance, the footings or grade beams should be poured "neat" against competent native soil or should be backfilled with compacted structural fill. Under such conditions, the footings can be designed for an allowable passive soil pressure of 300 pcf equivalent fluid weight for lateral resistance. A friction coefficient of 0.35 can be used for the subgrade soils. Provided the pipe piles are driven to the recommended refusal criteria, the estimated total post-construction settlement should be 1/4-inch or less, and the differential settlement across the structure should be 1/4-inch or less.

Vertical small-diameter pipe piles typically have minimal capacity to resist lateral forces. Such piles may need to be supplemented with helical anchors, battered piles, and/or enlarged grade beams and structural fill to provide sufficient lateral resistance.

The performance of pipe piles is dependent on how and to what bearing stratum the piles are installed. Since a completed pile in the ground cannot be observed, it is critical that judgment and experience be used as a basis for determining the driving refusal and acceptability of a pile. Therefore, we recommend that GEO Group Northwest be retained to monitor the pile installation operation, collect and interpret installation data and verify suitable bearing stratum. We also suggest that the contractor's equipment and installation procedures be reviewed by us prior to pile installation to help mitigate problems which may delay the progress of the work.

Conventional Concrete Basement and Retaining Walls

Active Earth Pressure

Walls that are not restrained horizontally are considered yielding, and should be designed for lateral soil pressure under the active condition. The following lateral soil pressures can be used for the active condition:

Recommended Active Earth Pressure

Backfill retained behind wall is level	40 pounds per cubic foot (pcf), equivalent fluid density
Backfill retained behind wall is sloped 2H:1V ascending behind the wall	60 pounds per cubic foot (pcf), equivalent fluid density

At-Rest Earth Pressure

Walls restrained horizontally on top (by floor slabs for example) are considered unyielding, and should be designed for lateral soil pressure under the at-rest condition. The following lateral soil pressures can be used for the at-rest condition:

Recommended At-Rest Earth Pressure

Backfill retained behind wall is level	50 pounds per cubic foot (pcf), equivalent fluid density
Backfill retained behind wall is sloped 2H:1V ascending behind the wall	70 pounds per cubic foot (pcf), equivalent fluid density

Passive Earth Pressure

The retaining wall should be designed to resist lateral passive earth pressures using the following parameters.

Recommended Passive Pressure and Friction Coefficient

Passive Pressure	300 pounds per cubic foot (pcf)
Coefficient of Friction (aka Friction Factor)	0.35

Seismic Earth Pressure

In addition to the soil pressures enumerated previously, a rectangular lateral pressure of 8H psf, where H is the wall height, should be included in the design of permanent basement walls to account for seismically-induced dynamic soil loading.

Drainage

The lateral soil pressure design criteria presented previously are applicable to fully-drained conditions for soils retained by the wall. To achieve the fully-drained condition, a vertical drain mat, Miradrain 6000 or equivalent, should be placed against the wall to facilitate drainage. The drain mat should extend from near the finished surface grade down to the base of the wall. The bottom of the drain mat should be bedded in the washed rock surrounding the wall footing drain. Additionally, a vertical drainage blanket consisting of at least 12-inches thick (in the horizontal direction) of free-draining gravel should be placed against the wall to prevent accumulation of water behind the wall that could exert hydrostatic pressure on the walls. The recommendations are illustrated in Plate 3 – Typical Retaining Wall Drainage.

The wall backfill should be compacted to 90 percent. The top twelve (12) inches should consist of relatively impermeable cap soil separated from the underlying granular material by a layer of geotextile fabric. The surface should be sloped to drain away from the wall. Alternatively, the surface can be sealed with asphalt or concrete paving.

Slab-On-Grade Floors

We recommend that slab-on-grade floors for the proposed new residence be structurally reinforced and/or pipe pile supported per the design of a structural engineer.

For other situations where slab floors are proposed, we recommend that the subgrade surface should be compacted to a firm condition. If loose or soft soils are detected, they should be over-excavated to a depth of at least 1 foot and then replaced with structural fill. Before the fill is placed, the subgrade surface should be compacted to a firm condition. The structural fill should be compacted to 95 percent of the materials maximum dry density as determined by ASTM D1557 (Modified Proctor).

Slab-on-grade floors should be underlain with a capillary break layer to prevent wicking of soil moisture upward to the slab. The capillary break should consist of a minimum four (4) inch layer of gravel or crushed rock containing no more than five (5) percent fines passing a No. 4 (1/4-inch) sieve. A 5/8-inch crushed rock with no minus fraction is an acceptable material for use as a capillary break. To reduce water vapor transmission through the slab, a vapor barrier such as a 10-mil thick plastic membrane may be placed between the capillary break and the slab.

Drainage

Surface Drainage

Final site grades should allow for drainage away from building structures. We recommend the ground be sloped at a gradient of at least three (3) percent for a distance of approximately ten feet away from buildings. Final site grades and impervious areas should be designed to collect surface water into catch basins and be tight-lined for discharge into the storm system or an appropriate discharge location.

Footing Drains

We recommend that footing drains should be installed along the base of perimeter building footings and retaining wall footings. Footing drains should consist of a four (4) inch minimum diameter, perforated, rigid drain pipe laid at or near the bottom of the footing with a gradient sufficient to generate flow. The drain should be bedded and covered with washed drain rock and the drain rock should be protected with geotextile filter fabric, such as Mirafi 140N, or equivalent, as shown on Plate 4 – Footing Drain Detail.

Footing drains should be tightlined to an appropriate discharge location. Other drainage lines should not be connected to the footing drain system. We recommend sufficient clean-outs be installed to allow for periodic maintenance of the drain lines.

Driveways

Subgrade Preparation

The performance of the pavements is related to the condition of the underlying subgrade. Settlement or movement of the subgrade will be reflected up through the paving. The subgrade surface in new and replaced driveway areas should be dense and non-yielding.

If imported structural fill is used for sub grade material, the top foot of the structural fill should be compacted to at least 95% maximum dry density, and the underlying structural fill should be compacted to at least 90% maximum dry density. After the preparation has been completed, the subgrade should be proof-rolled under the observation of the geotechnical engineer to verify that it is dense and unyielding.

Provided the subgrade is dense and unyielding, a pavement section consisting of at least 2.5 inches of Class "B" Asphalt Concrete over at least 6 inches of 5/8-inch minus crushed surfacing top course is recommended.

Proposed Driveway Bridge Support

In our opinion, the proposed driveway bridge can be supported using a combination of augered concrete piles and small-diameter steel pipe piles. Our recommendations regarding design and installation of these piles are presented below.

Augered Concrete Piles

We recommend that augered concrete piles be embedded at least 8 feet into dense or very stiff native soils, such as those encountered in Borings B-2 and B-3 from our subsurface exploration. The concrete piles may be installed by either open-hole or auger-cast methods. If open-hole methods are selected, we recommend that the contractor have temporary casing available on site during the installation in the event of potential soil caving or groundwater flow into the drill holes. Our recommended allowable axial capacities for the piles are tabulated below.

AUGERED CONCRETE PILE AXIAL CAPACITIES*

Pile Diameter (inches)	Minimum Pile Depth (feet)	Pile Embedment (feet)	Allowable Bearing Capacity (tons)	Allowable Uplift Capacity (tons)
18	20	10	18	9
24	20	10	32	16

* As allowable capacities incorporate a factor of safety of 3.

With regard to lateral load capacities, we recommend that the piles be assigned an allowable capacity of 3 tons per pile, unless otherwise calculated by a structural engineer.

A one-third increase in the above allowable pile capacities (axial and lateral) can be used when considering short-term seismic loads. No reduction in the above recommended capacities is required if the pile spacing is at least three times the pile diameter.

The performance of the concrete piles depends on how and to what bearing stratum the piles are installed. It is critical that judgment and experience be used as a basis for determining the embedment length and acceptability of a pile. Therefore, we recommend that GEO Group Northwest be retained to monitor the pile installation operation, collect and interpret installation data, and verify that the piles are installed consistent with the project plans. We also suggest that the contractor's equipment and installation procedure be reviewed by GEO Group Northwest, Inc. before the start of the installation work to help mitigate problems which could delay the progress of the work.

Small-Diameter Pipe Piles

Support of the eastern end of the proposed driveway bridge can be provided using a combination of small-diameter steel pipe piles and grade beams. Our recommendations regarding the use of pipe piles are provided above in the foundations section of this report. Based on the findings from our subsurface investigation, we estimate that pipe pile installation depths at the top of the steep slope area may reach approximately 25 to 30 feet below existing grade.

LIMITATIONS

This report has been prepared for the specific application to the subject project. The findings and recommendations stated herein are based on our field observations, the subsurface conditions encountered in our site exploration, our experience, and judgment. The recommendations are our professional opinion derived in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area and within the budget constraint. No warranty is expressed or implied.

In the event the soil conditions are found to vary from those described herein, GEO Group Northwest, Inc., should be notified and the recommendations herein re-evaluated, and where necessary, be revised. GEO Group Northwest, Inc., should be retained to review the final design plans to confirm the plans conform to the recommendations contained in this report.

Sincerely,

GEO GROUP NORTHWEST, INC.

Keith Johnson
Project Geologist

William Chang, P.E.
Principal

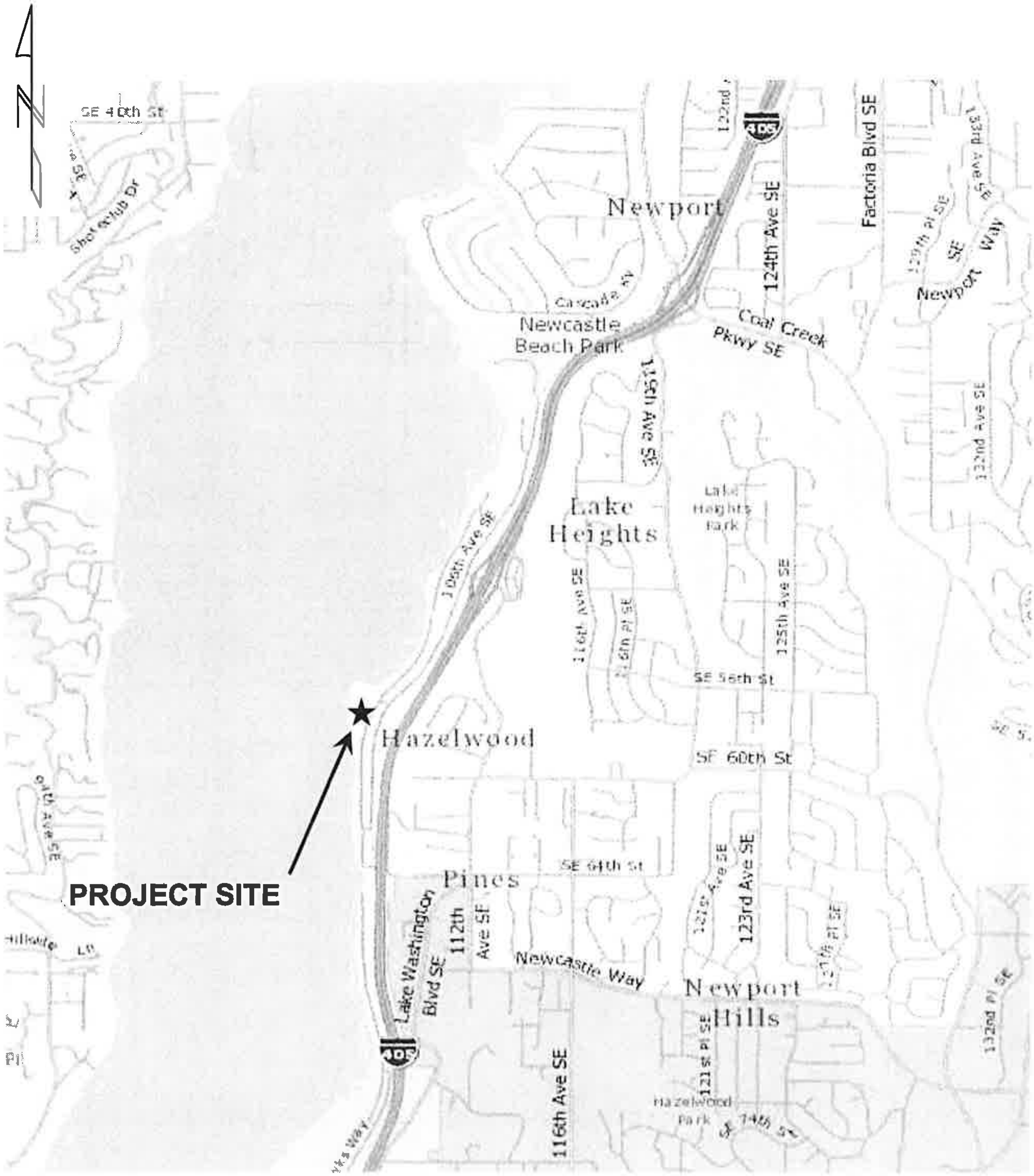
Plates: Plate 1 – Site Location Map
Plate 2 – Site Plan
Plate 3 – Typical Retaining Wall Drainage
Plate 4 – Typical Footing Drain

Attachments: Attachment 1 – Boring Logs
Attachment 2 – Description of Proposed Project

PLATES

G-4755

GEO Group Northwest, Inc.



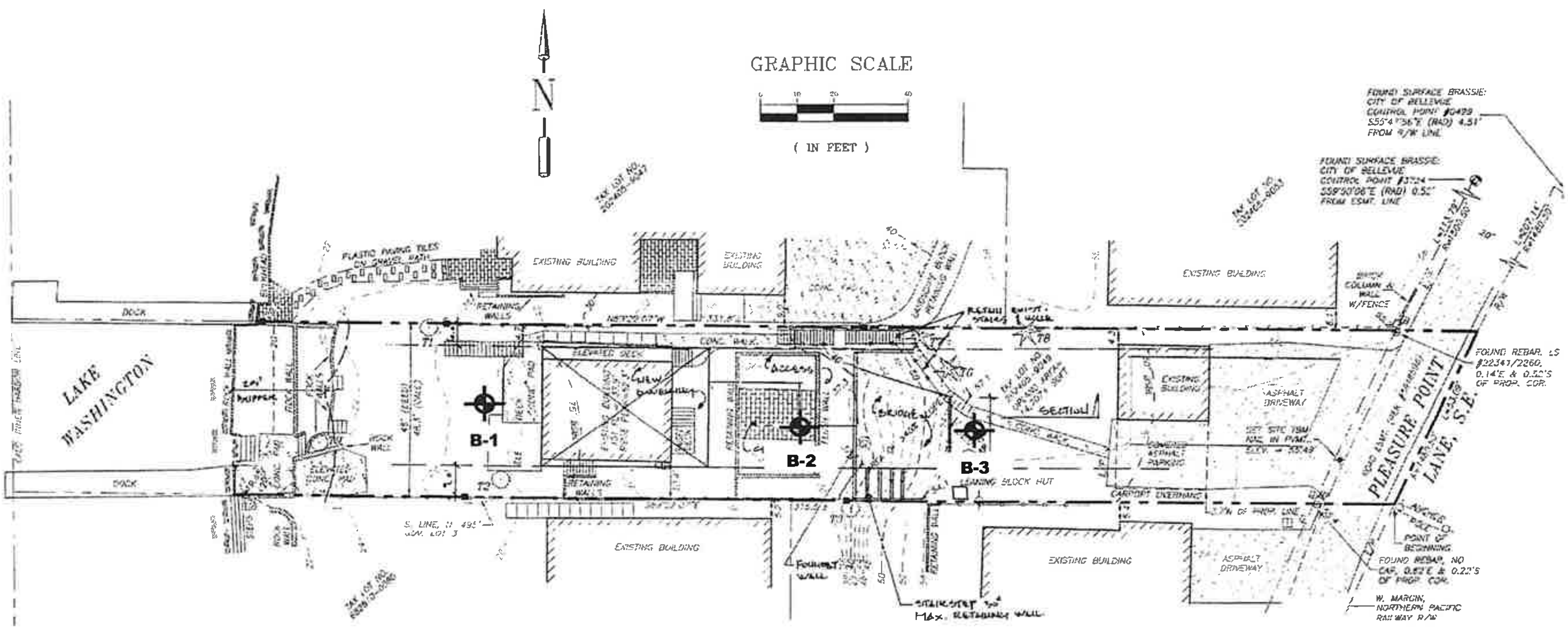
Source: King County GIS, 2017.

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists

SITE LOCATION MAP

PROPOSED RESIDENTIAL REDEVELOPMENT
5643 PLEASURE POINT LANE SE
BELLEVUE, WASHINGTON

SCALE:	1" = 0.5 mi ±	DATE:	8/22/2018	MADE:	KJ	CHKD:	WC	JOB NO:	G-4755	PLATE	1



LEGEND

EXPLORATORY SOIL BORING LOCATION B-1

A A' LINE OF SITE PROFILE (PLATE 3)

0 30 60

SCALE: 1 INCH = 30 FEET

Source: Topographic Survey by Crones LLC, revision dated 1/17/18, and annotated by Horner Design Associates.

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists

SITE PLAN

PROPOSED RESIDENTIAL REDEVELOPMENT
5643 PLEASURE POINT LANE SE
BELLEVUE, WASHINGTON

SCALE	1" = 30'	DRAWN BY	KJ	CHECKED BY	WC	DATE	10/12/2018	PROJECT NO.	G-4755	PLATE	2

January 11, 2019 G-4755

Mr. J. Mike Brown
EPC Holdings 915, LLC
3703 Lake Washington Blvd. N.
Renton, Washington 98056

Subject: Addendum to Geotechnical Engineering Study and Critical Areas Report, Proposed Residential Redevelopment, 5643 Pleasure Point Lane SE, Bellevue, Washington

Reference: Geotechnical Engineering Study and Critical Areas Report, Proposed Residential Redevelopment, 5643 Pleasure Point Lane SE, Bellevue, Washington (Project No. G-4755). GEO Group Northwest, Inc., October 12, 2018.

Dear Mr. Brown:

GEO Group Northwest, Inc. has completed its slope stability analysis regarding the proposed residential remodeling project at the above-subject location in Bellevue, Washington. This letter presents our activities, conclusions and recommendations regarding slope stability at the site.

SLOPE STABILITY ANALYSIS

We performed a stability analysis for the project using information from the topographic survey for the project site and the findings from our subsurface explorations. The location of the slope profile used for the analysis is shown in Plate 1 – Site Plan. The analysis was performed using the computer analysis program Slide 7.0 published by Rocscience, Inc. This program analyzes slope stability via various calculation methods. For this study, Bishop's Modified Method of Slices was used to perform the analyses.

The calculated stability is represented as a factor of safety (FS) against slope failure. The FS value is dimensionless and is defined as the value of the resisting forces mobilized from the soil mass divided by the driving forces toward movement of the soil. An FS value of 1.0 represents a situation where both forces are equivalent, and movement of the soil is at or near its threshold. An FS value slightly above 1.0 indicates a slope with minimal stability. For the purposes of this study, an FS value of at least 1.5 is considered to indicate a sufficiently stable condition for the slope under static conditions. An FS value of at least 1.2 is considered sufficiently stable for a short-term dynamic condition such as seismic loading during an earthquake.

Analysis Parameters

The surface and subsurface soil types encountered in our explorations were categorized into discrete soil units, based on soil type classification and relative density or consistency. Analysis parameters for these soil units (unit weight, cohesion, friction angle) were obtained from published correlations with standard penetration test (SPT) data, soil grain-size properties, and other attributes, and also were selected based on our experience with past stability analyses involving similar soil types and our interpretation of the site conditions. The soil parameters developed from this analysis are summarized in the following table.

Soil Unit Descriptions and Parameters

Unit	Soil Description	Unsaturated Unit Weight (pcf)	Appaent Cohesion (psf)	Friction Angle (deg)
I	Loose SAND	110	50	30
II	Loose SP/SM/ML	110	60	30
III	Dense SAND	120	50	38
IV	Medium Dense SP/SM/ML	115	60	35
V	Stiff SILT	110	100	30
VI	Hard SILT	120	200	35

Analysis Scenarios

We performed analyses of the existing slope condition and of alternative post-construction conditions involving the presence of a structurally-supported driveway bridge, deck, and approach. Approach length options of 10 feet and 16 feet from the top of the slope were analyzed. These scenarios were analyzed for both static and design seismic cases.

Analysis Results

The profiles and analysis results for the existing slope condition and for the alternative post-construction conditions described above are presented in Attachment 1. The plates labeled Slide 2 illustrate the existing condition. The plates labeled Slide 3 and Slide 31 illustrate the alternative conditions of structurally-supported approaches having 10 and 16 feet, respectively. The plates illustrating the static case results show the minimum FOS failure surface and all other generated surfaces having a FOS of less than 1.5. The plates illustrating the seismic case results show the minimum FOS failure surface and all other generated surfaces having a FOS of less than 1.2.

A minimum FS value of approximately 1.3 was calculated for failure surfaces under existing static conditions, and a minimum FS value of approximately 0.9 was calculated for failure surfaces under the modeled seismic condition. The failure surfaces in the static case extended back a distance of up 10 feet from the top of the slope, and extended to a distance of up to approximately 20 feet in the seismic condition. Similar results were calculated for the alternative post-construction conditions, without significant difference between the used approach lengths.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our study and our understanding of the configuration of the proposed development, it is our opinion that the proposed residential development will not adversely affect the stability of the existing steep slope at the site property, provided that the following conditions are met:

1. the recommendations in our referenced geotechnical engineering investigation and critical areas report are properly implemented during project design and construction; and

2. The portion of the proposed driveway extending to a distance of 20 feet east from the top of the steep slope is structurally supported to not impose a significant load on the underlying soils.

If it is desired to improve the stability of the site, then re-grading of the slope and area east of the slope will be required to reduce its inclination and height, or the slope will need to be structurally-supported with one or more retaining walls, or a combination of both measures will be needed.

structurally-supported with one or more retaining walls, or a combination of both measures will be needed.

LIMITATIONS

This letter has been prepared for the proposed development of the property as described in this report. Additionally, this report has been prepared for the exclusive use of Mr. J. Mike Brown and his authorized representatives or agents. We recommend that this letter be included in its entirety in the project plan documents for reference during design and construction.

Our findings, conclusions, and recommendations stated herein are based upon our observations, analysis, experience, and judgment. The conclusions and recommendations are our professional opinions derived in a manner consistent with the level of care and skill ordinarily exercised by other members of the geotechnical engineering profession currently practicing under similar conditions in the local area, and within the project schedule and budget limitations. No warranty of the contents of this letter is expressed or implied.

Sincerely,

GEO Group Northwest, Inc.

State of Washington
Engineering Geologist
1005
Licensed Geologist
KEITH A. JOHNSON

Keith Johnson
Project Geologist

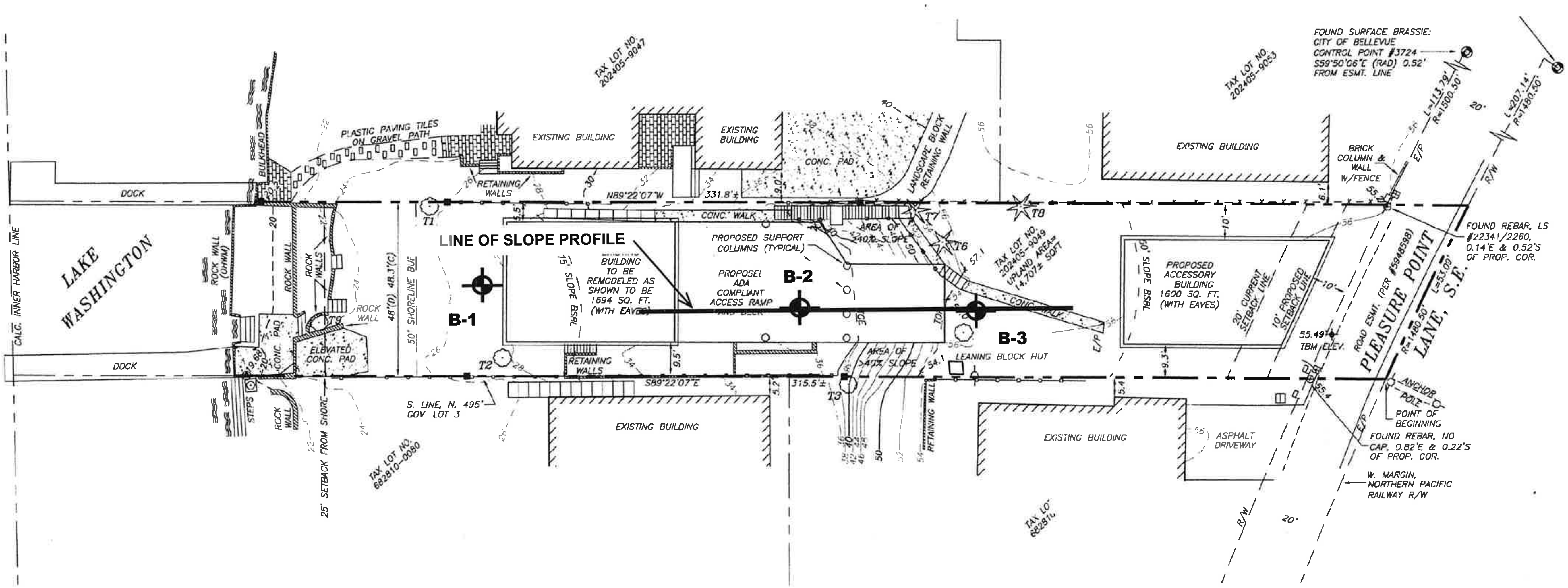
WILLIAM CHANG
STATE OF WASHINGTON
20114
REGISTERED
PROFESSIONAL ENGINEER

William Chang, PE
Principal

Plates and Attachments:

Plate 1 – Site Plan

Attachment 1 – Slope Stability Analysis Results



LEGEND

EXPLORATORY SOIL BORING LOCATION (B-1)

A — A' LINE OF SITE PROFILE (PLATE 3)

0 30 60

SCALE: 1 INCH = 30 FEET

Source: Topographic Survey by Crones LLC, revision dated 12/21/18, and annotated by Horner Design Associates.

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists

SITE PLAN

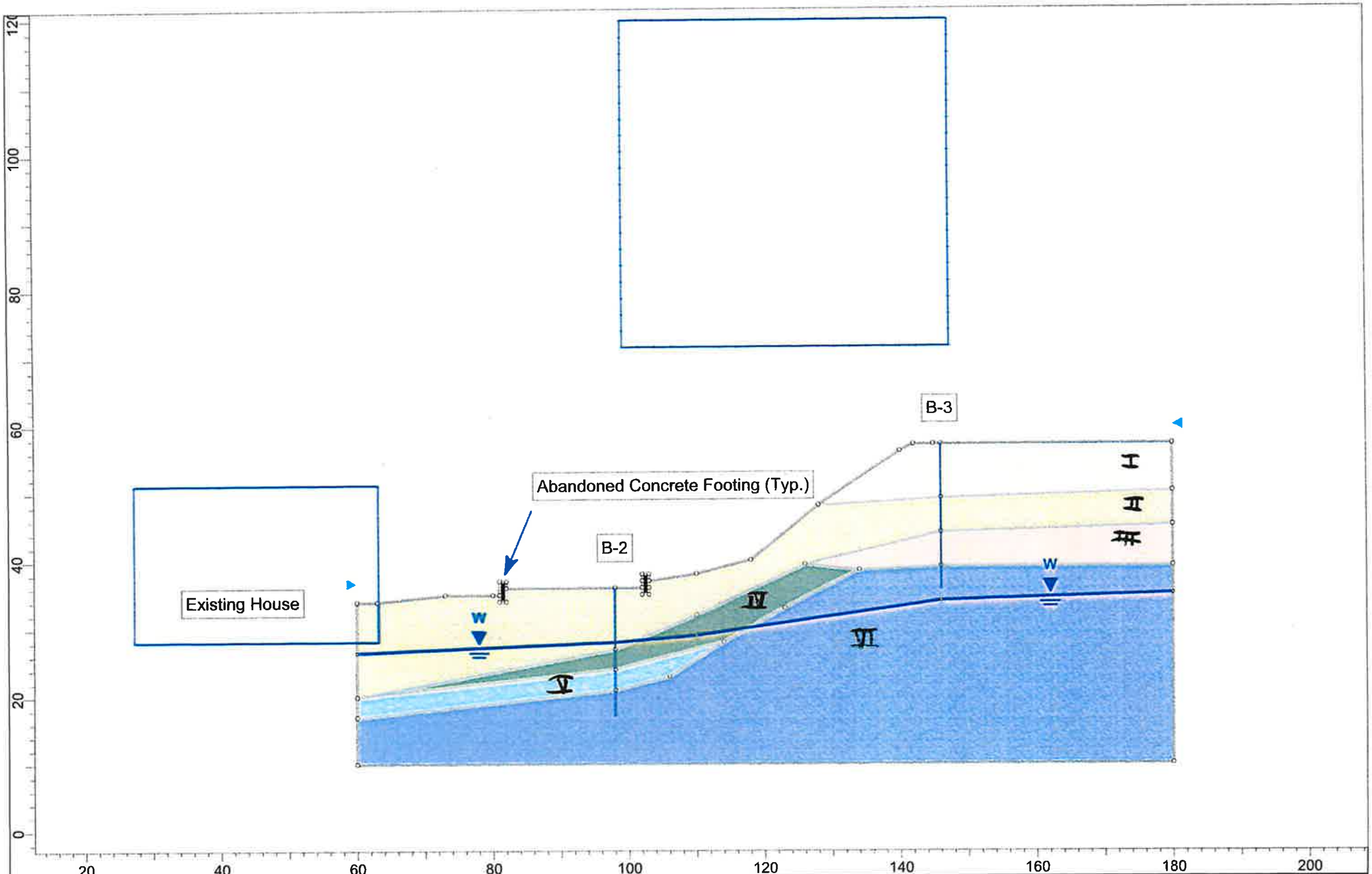
PROPOSED RESIDENTIAL REDEVELOPMENT
5643 PLEASURE POINT LANE SE
BELLEVUE, WASHINGTON

SCALE	1" = 30'	DRAWN BY	KJ	CHECKED BY	WC	DATE	1/10/2019	PROJECT NO.	G-4755	PLATE	1

ATTACHMENT 1

G-4755

SLOPE STABILITY ANALYSIS RESULTS



SLIDE 7.031

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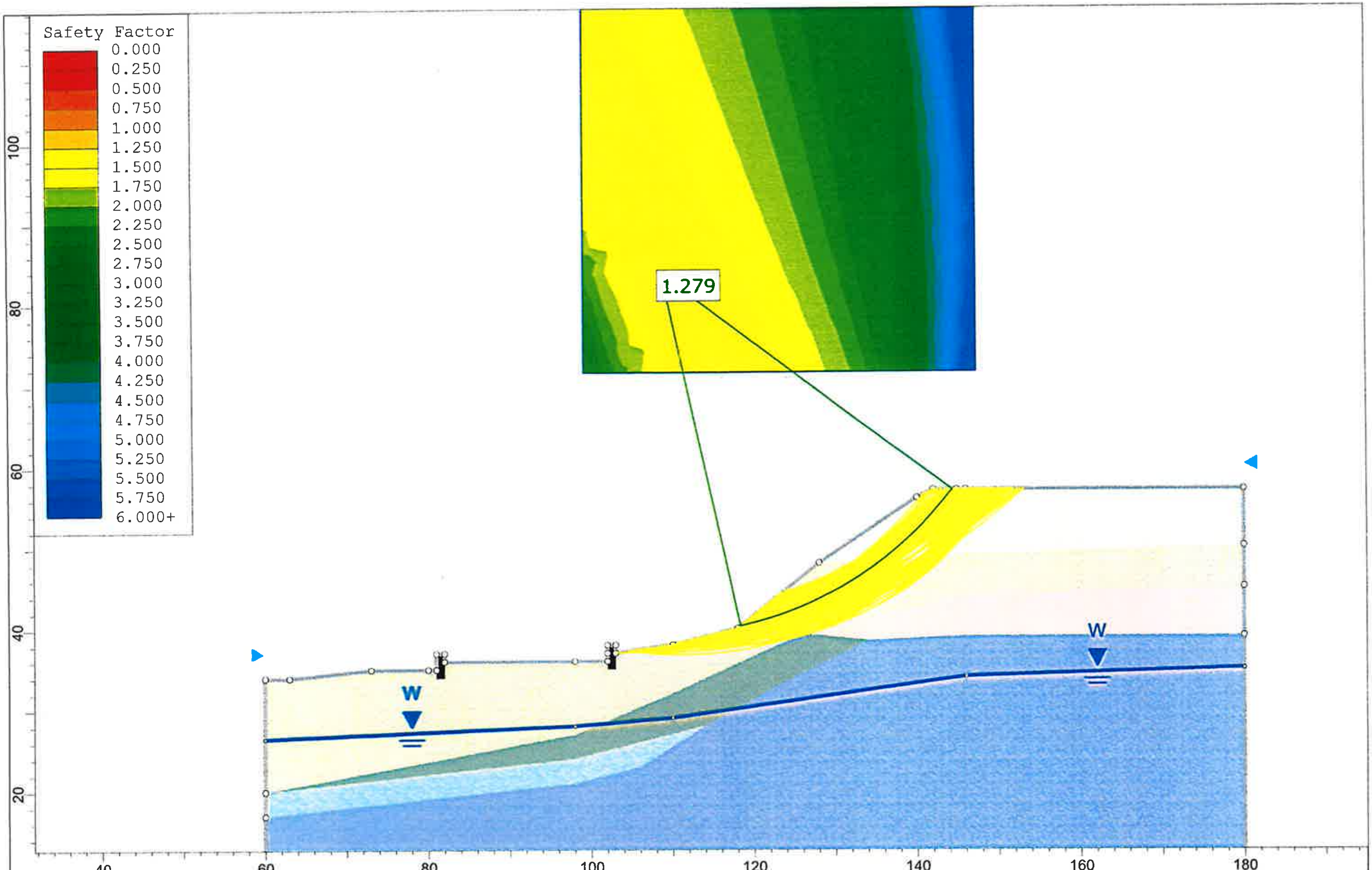
Date		File Name	Slide 2.slmd



rocscience

SLIDEINTERPRET 7.031

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Analysis Description			
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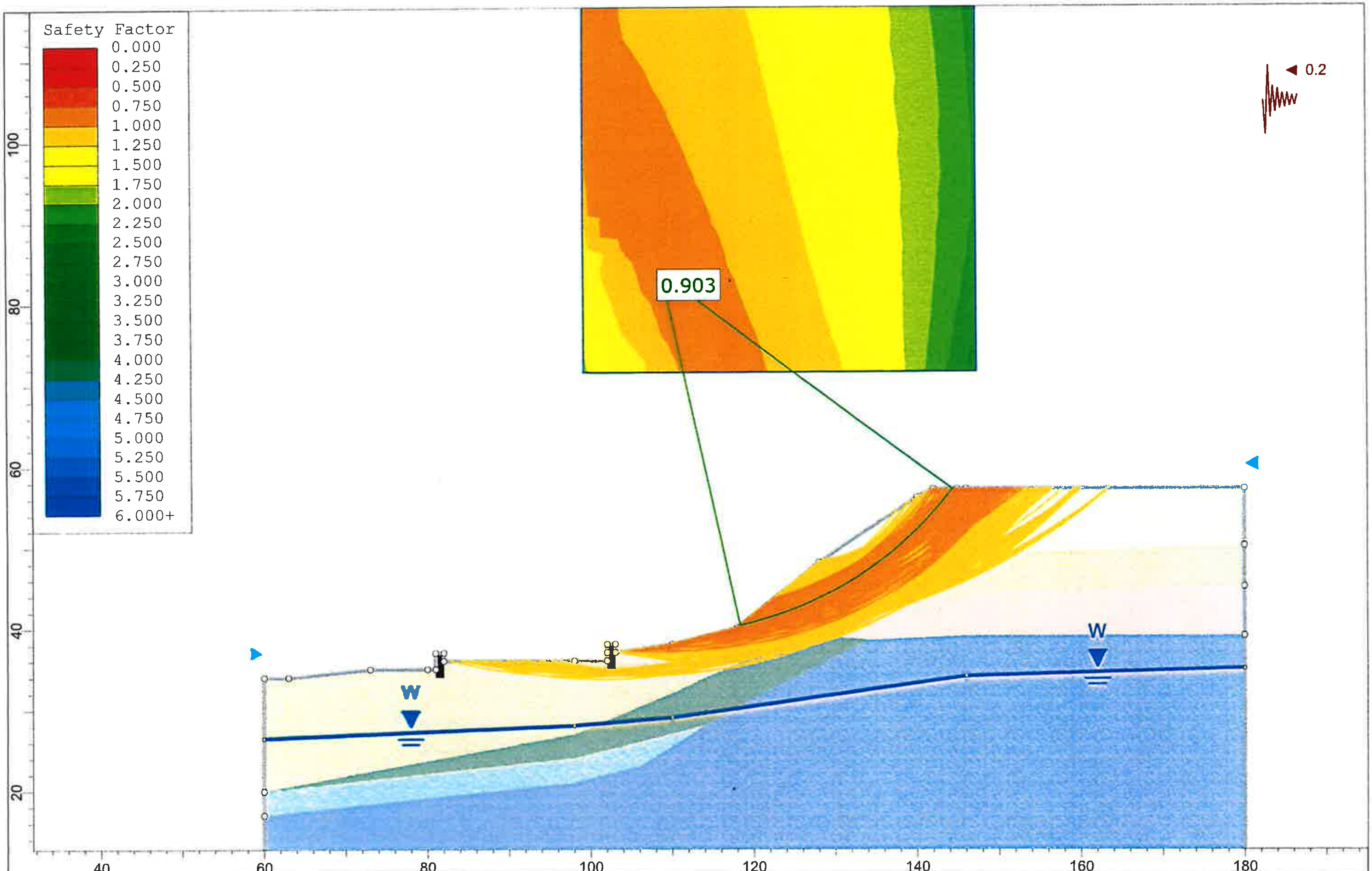

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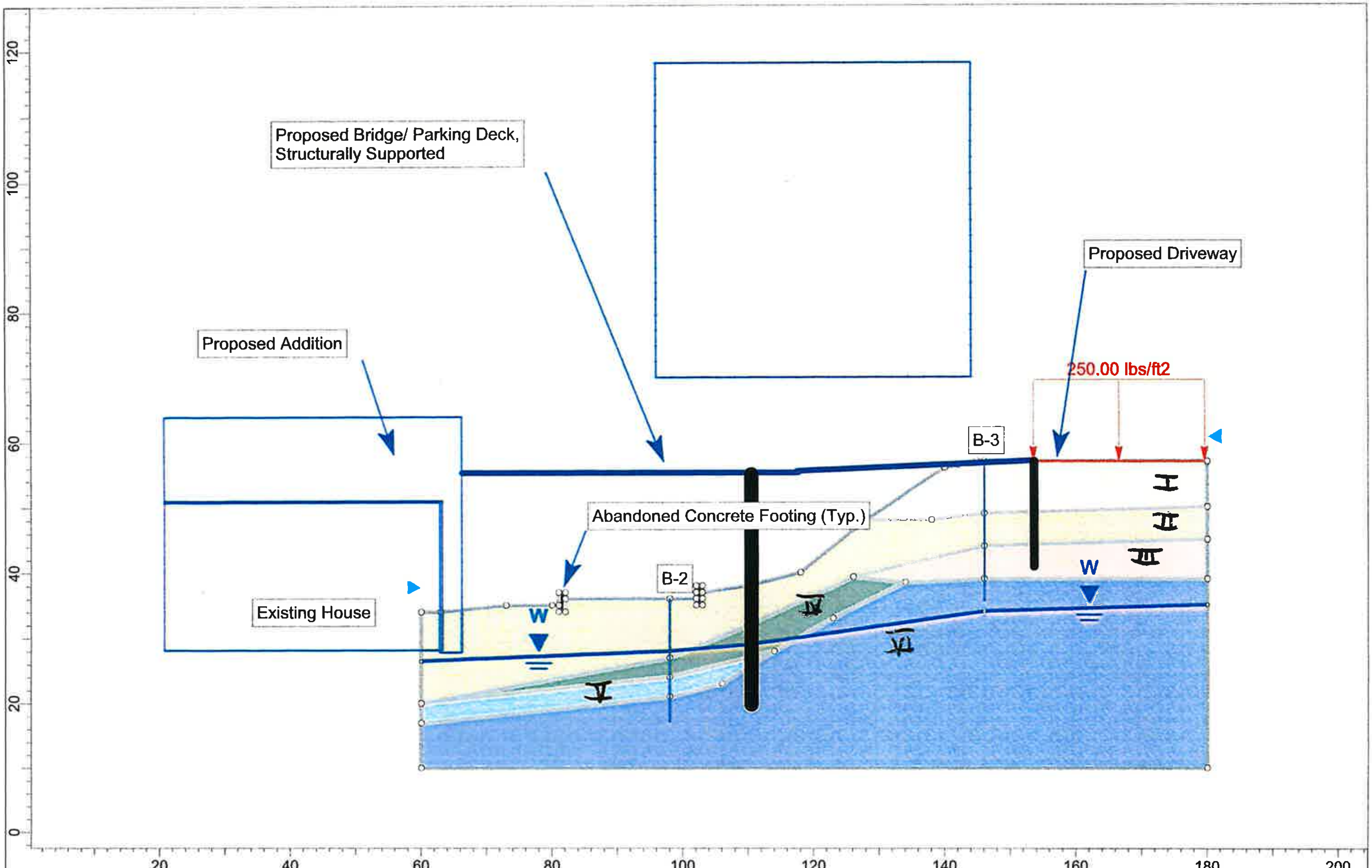

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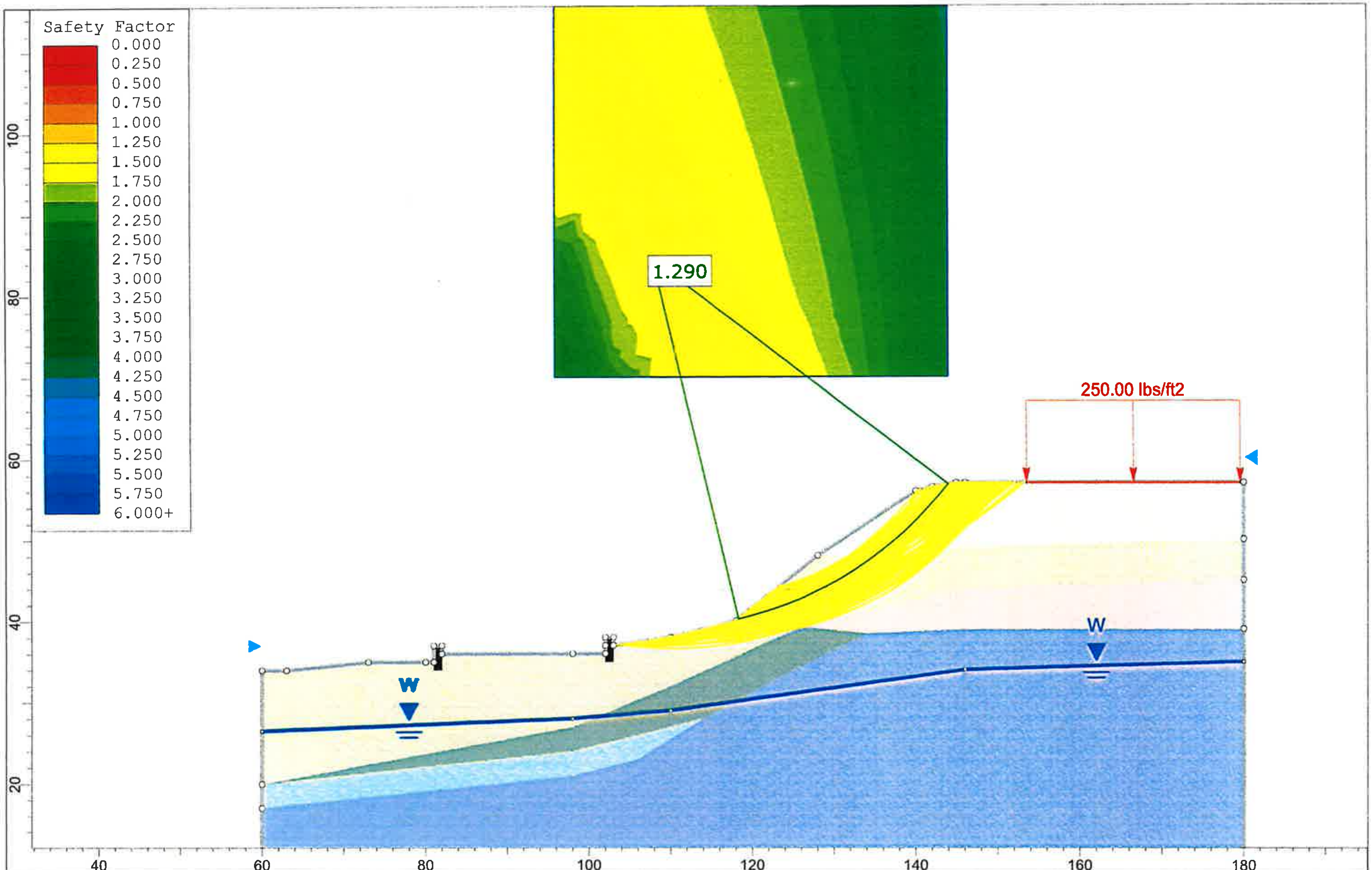
SLIDE 7.031	Date			File Name Slide 3.slmd



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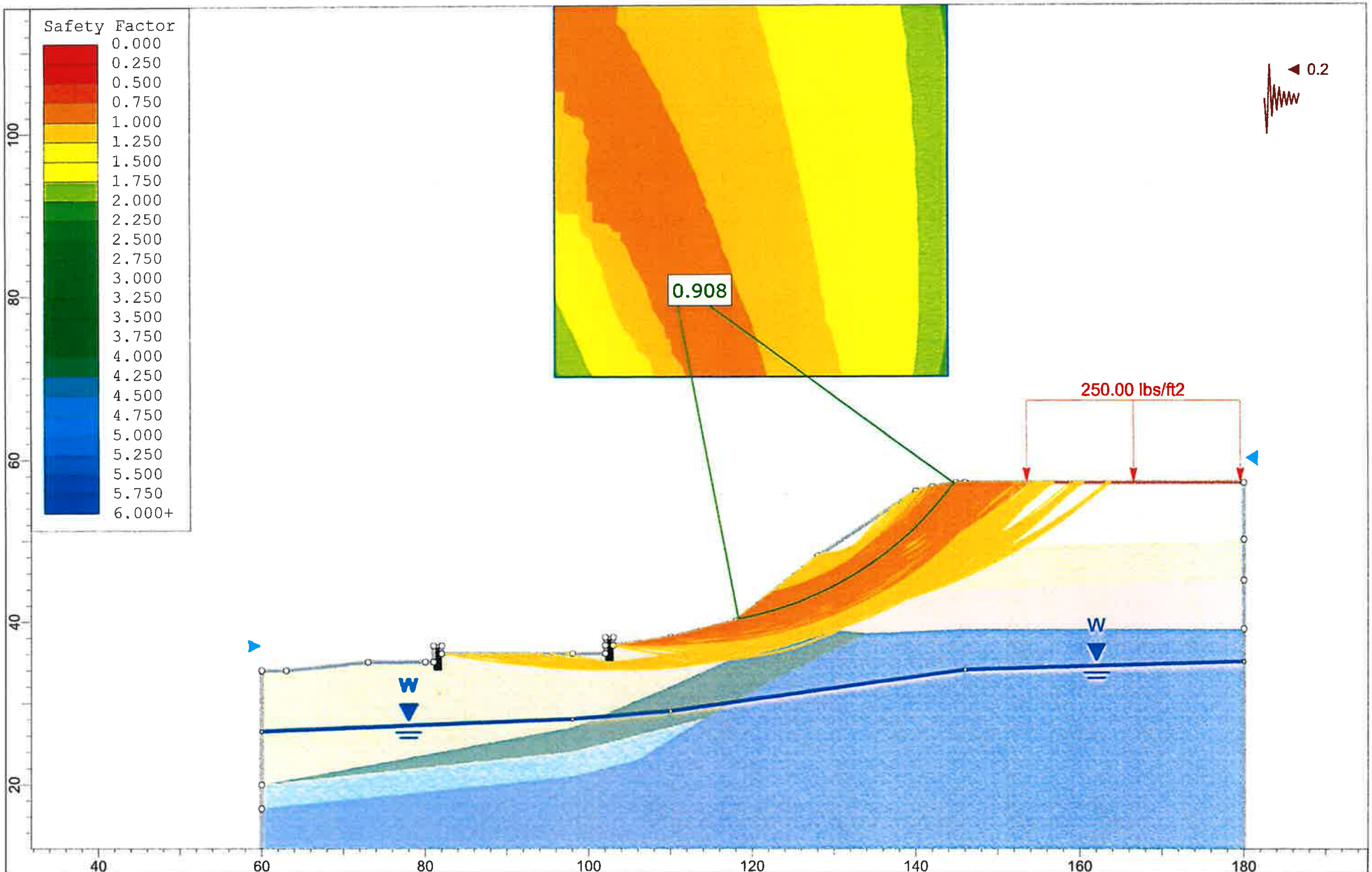

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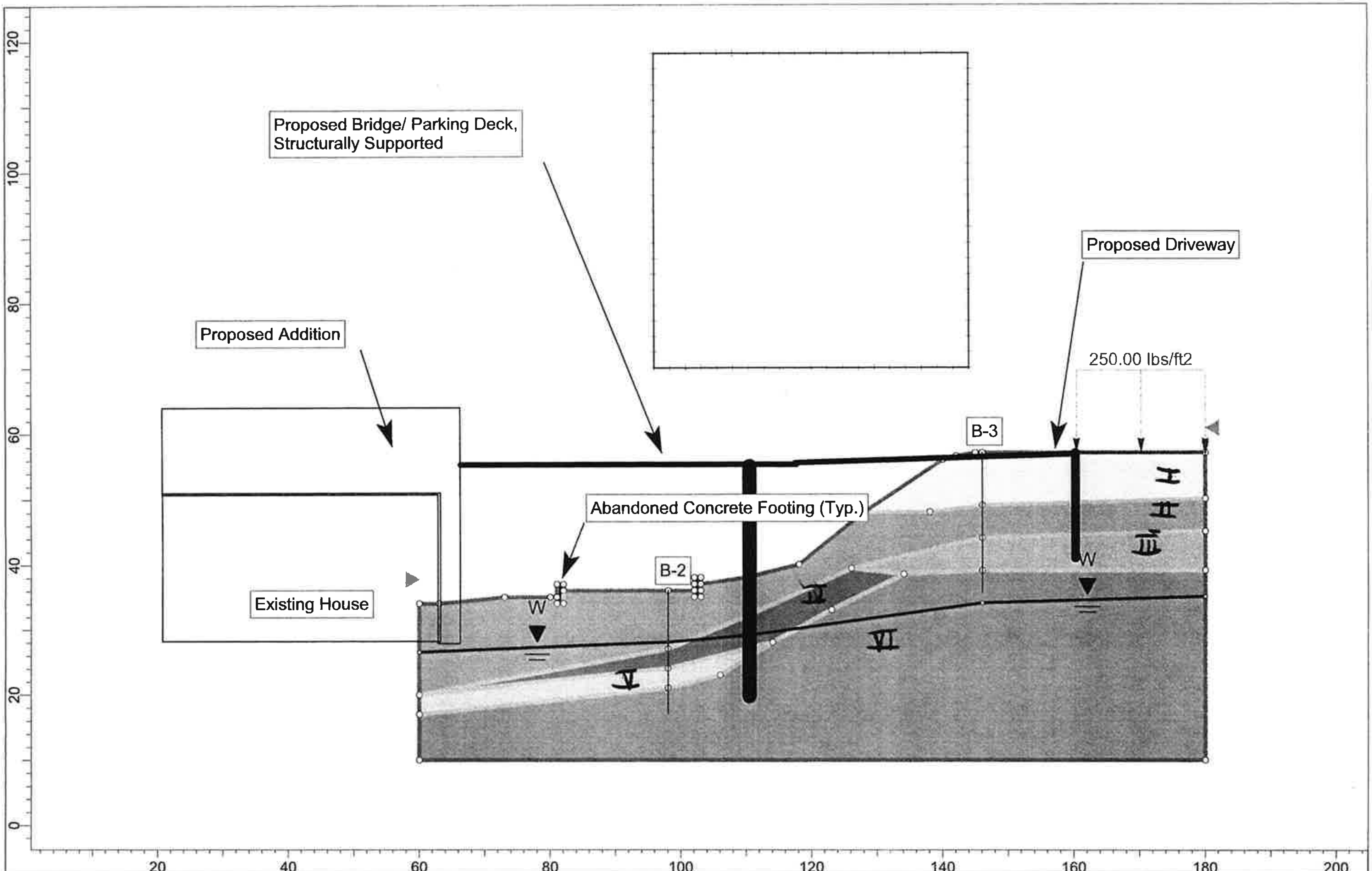


Project: 5643 Pleasure Point Lane SE

Analysis Description:

Drawn By:

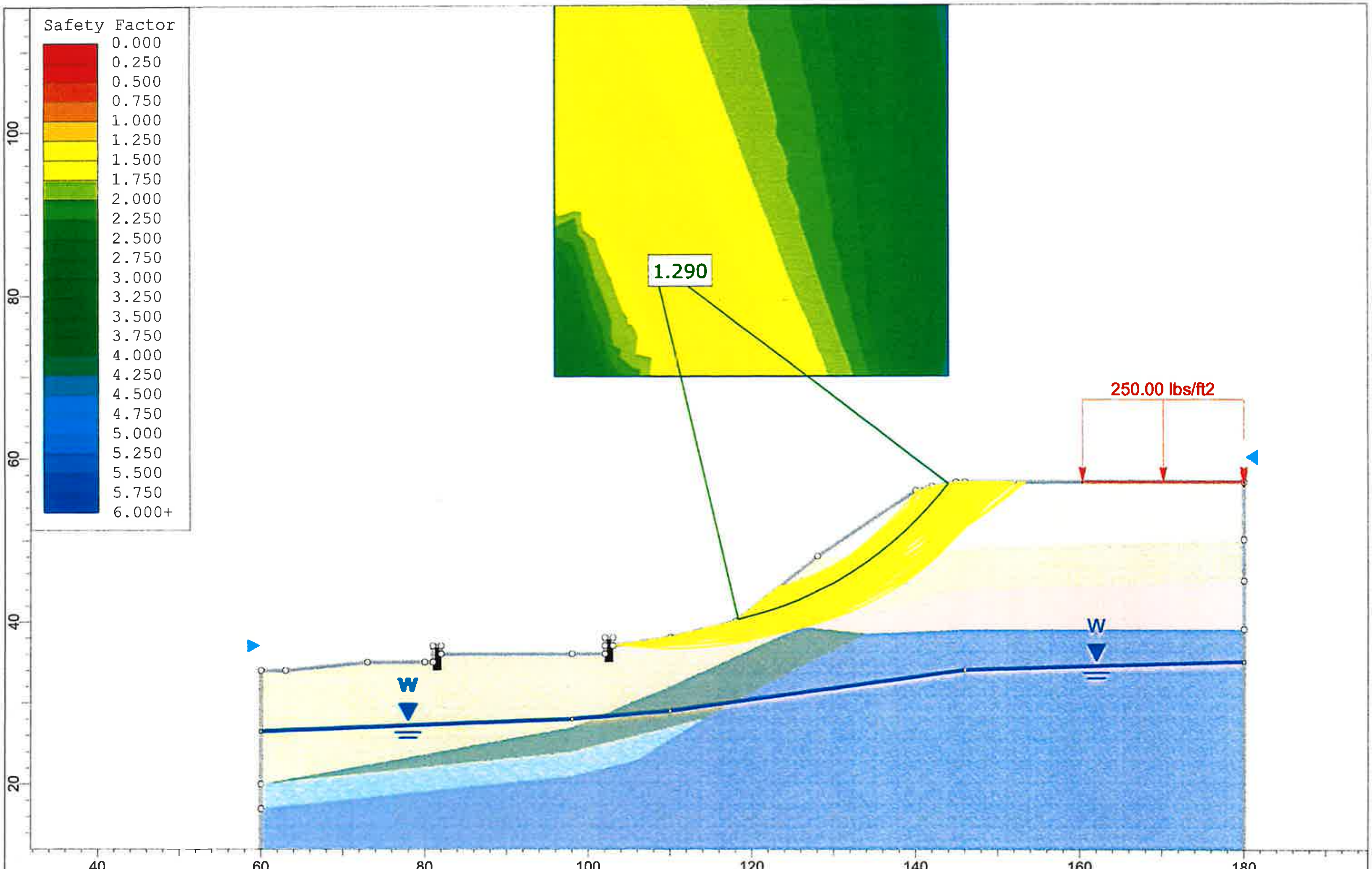
Scale: 1:250

Company: GEO Group Northwest, Inc.

Date:

File Name: Slide 3l.slmd

SLIDE 7.031



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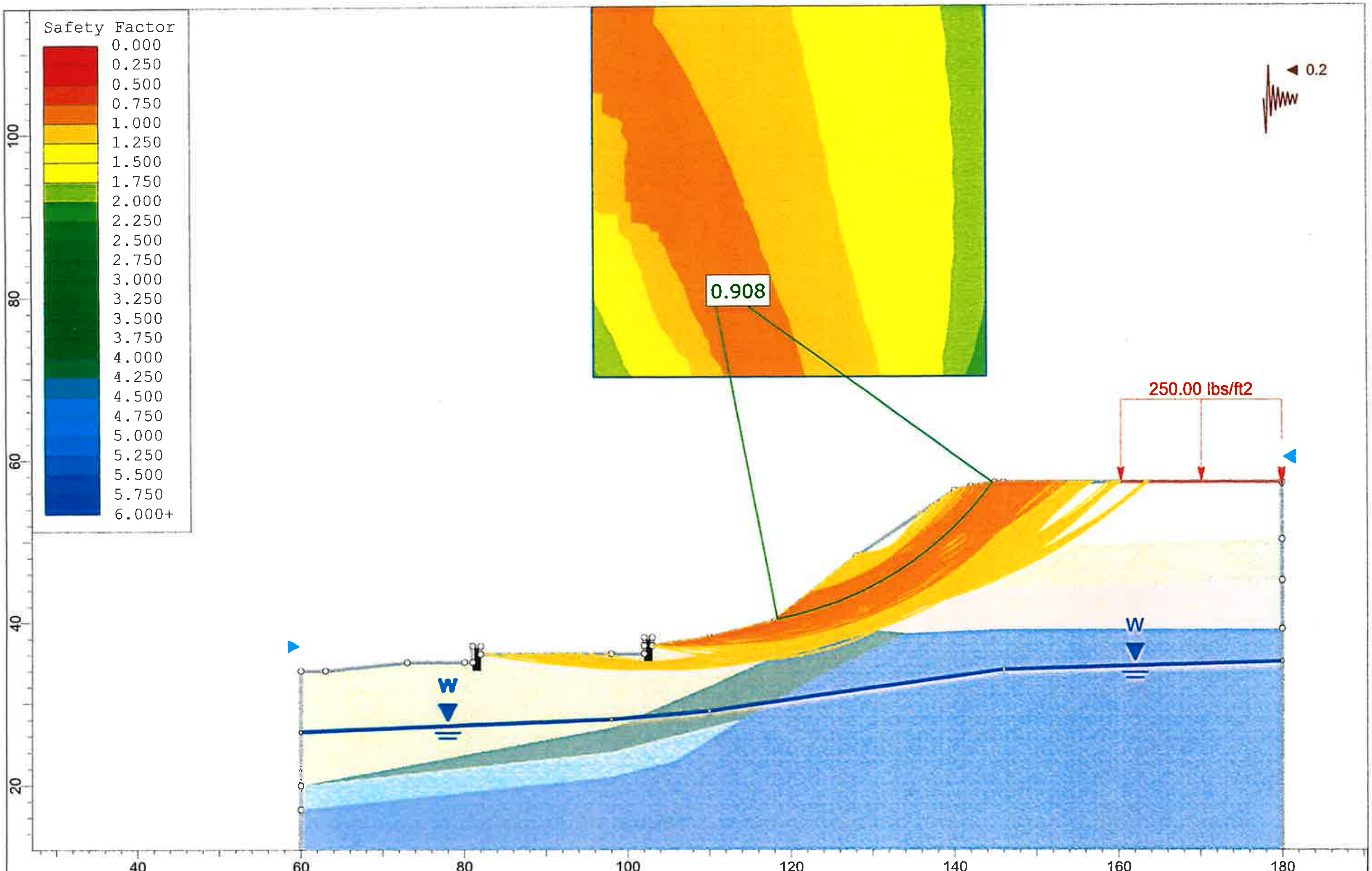

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